CHEMICALS
Success Story

Methanol Recovery from Hydrogen Peroxide Production

New Process Recovers and Cleans Contaminated Methanol for Reuse

Benefits

- Through 2000, the cumulative energy savings have been over 218 billion Btu
- Through 2000, the cumulative reduction in NO_x emissions have been over 15 tons and the cumulative CO_2 reduction has been over 12,000 tons
- Reduced requirements for virgin methanol by an amount equivalent to that recovered (90% to 98%), conserving petroleum feedstock
- Reduced or eliminated incineration of contaminated methanol
- Dillution of undesirable peroxides and metal ions in the distillation column, reducing the risk of fire or explosion

Applications

This process can be applied to all industrial production of hydrogen peroxide by the organic process, as well as in any industrial plant where spent methanol occurs as a waste stream.

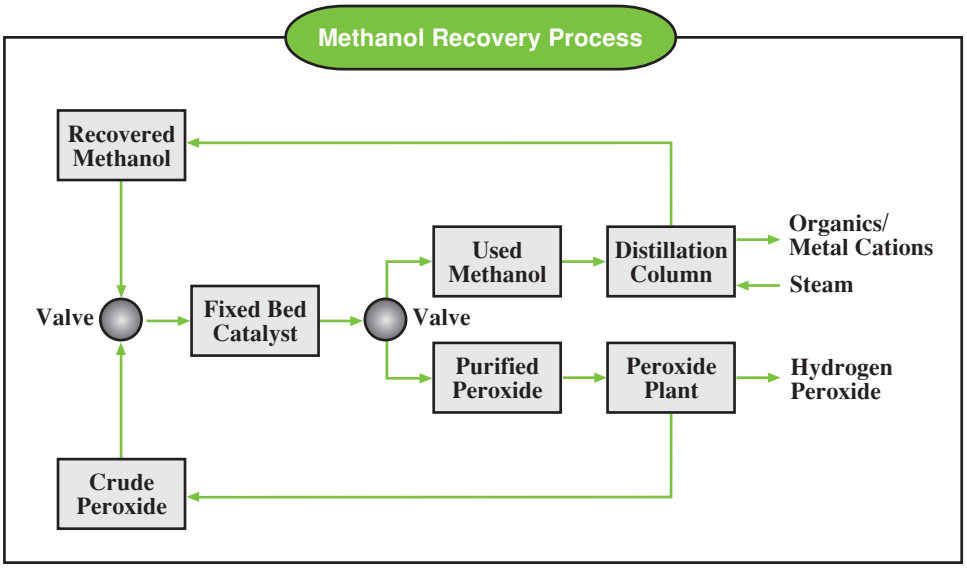
Project Partners

- FMC Corporation
  Pasadena, TX
- Texas Natural Resource Conservation Commission
  Austin, TX

In 1991 new environmental regulations began requiring that U.S. companies generating hazardous methanol waste find a better way to dispose of this material. In the past, companies could dispose of contaminated methanol by burning it as a waste fuel in cement kilns. With the new regulations, this hazardous methanol waste has to be burned in incinerators, substantially increasing costs and energy consumption.

To deal with the new regulations, FMC Corporation began devising an innovative method to recover and reuse the methanol waste produced while purifying crude hydrogen peroxide. As a participant in the U.S. Department of Energy's NICE^3 (National Industrial Competitiveness through Energy, Environment, and Economics) Program, FMC received a $96,000 grant to help demonstrate this innovative technology. FMC Corporation and the Texas Natural Resource Conservation Commission provided most of the financial support for the project.

To recover the spent methanol, FMC developed a new method of direct steam distillation and began operating the new recovery system in 1992 at its hydrogen peroxide plant in Pasadena, Texas. In its first year of operation, the process successfully recovered about 98% of the spent methanol—



compared with the 90% recovery originally projected. Energy and financial costs for transporting and incinerating the waste were successfully reduced along with the need for virgin methanol. The innovative technology also created a safer work environment by reducing buildup of potentially flammable or even explosive materials in the distillation column.

Mr. Harshad Thakkar of FMC's Peroxygen Chemicals Division noted, "Increasing methanol prices and disposal costs were becoming serious economic concerns for us. The NICE^3 grant made it possible for us to develop this technology and solve several problems at once." In 2000 the two units operating in the U.S. saved an estimated total of 25 billion Btu. The final results realized not only energy and monetary savings, but a system that significantly reduced the volume of hazardous waste created during the production of hydrogen peroxide. The system has helped FMC meet its corporate commitment to reduce overall waste generation by 50%.

"In a little more than one year," Thakkar said, "this system paid for itself. It's hard to beat a payback like that." The total cost to develop and construct the system was $497,000, of which FMC provided $305,000. In the first year of operation alone, the system reduced FMC's operating costs by nearly half a million dollars.

In addition to the original unit installed at the Pasadena facility, a second unit was installed at FMC's West Virginia facility in 1994. The second unit realized about the same energy savings as the original unit. In 1995/96, a third unit was installed at an FMC facility in Prince George, British Columbia. All three units remain in operation. To date, the two units operating in the United States have saved more than 218 billion Btu. No additional units or commercialization efforts are planned at this time.

While the annual energy savings and waste reduction for each unit vary proportionally with the throughput rate, Mr. Tom Solomon, the FMC project contact, noted that the three systems combined have reduced methanol waste production by more than 85%. "It is truly a success story both from an energy savings standpoint as well as protection of the environment through waste reduction."

Industry of the Future — Chemicals

The chemical industry is one of several energy- and waste-intensive industries that participate in OIT's Industries of the Future initiative. In December 1996, the chemical industry published a report, entitled ***Technology Vision 2020: The U.S. Chemical Industry,*** *that helps establish technical priorities for improving the industry's competitiveness and develops recommendations to strengthen cooperation among industry, government, and academia. It also provides direction for continuous improvement through step-change technology in new chemical science and engineering technology, supply chain management, information systems, and manufacturing operations.*

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NICE^3 – National Industrial Competitiveness through Energy, Environment, and Economics: An innovative, cost-sharing program to promote energy efficiency, clean production, and economic competitiveness in industry. This grant program provides funding to state and industry partnerships for projects that demonstrate advances in energy efficiency and clean production technologies. Awardees receive a one-time grant of up to $525,000. Grants fund up to 50% of total project cost for up to 3 years.

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